Research Paper

Effect of Self-care Education via Telenursing on Health Behaviors in Cancer Patients

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ABSTRACT

Background: Morbidity and mortality from coronavirus are more likely in vulnerable groups, such as cancer patients. Implementing self-care education for prevention in these patients is a priority. This study aimed to investigate the effect of telenursing education on self-care behaviors that prevent COVID-19 in cancer patients.

Methods: This interventional study was conducted at Vasei Sabzevar Hospital on patients with various types of cancer undergoing chemotherapy and radiation therapy in 2020 coinciding with the second peak of COVID-19, for one month (30 minutes daily). Two-stage sampling was conducted in the intervention group (31 participants) and the control group (26 participants). Self-care and patient follow-up training on the prevention of COVID-19 were conducted through WhatsApp. Data were collected using a researcher-made self-care questionnaire, a demographic questionnaire, and a medical information form.

Results: The mean age of the participants was 58.24±13.27 years, with the majority being female (n=35; 61%). Breast cancer was the most common cancer among the studied subjects (n=24; 42.1%). In the intervention group, the mean score of self-care before the intervention was 21.65±8.72 and after the intervention, it was 36.76±3.14. The results of the independent t-test showed a significant difference between the two groups (P<0.001). Fisher's exact test did not indicate a significant difference between the two groups in terms of COVID-19 morbidity (P=0.118).

Conclusion: The results of the present study showed that telenursing education improves self-care behaviors in the prevention of coronavirus in cancer patients.

Keywords: Self-care, Education, Cancer, COVID-19, Prevention

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Introduction

In late December 2019, the outbreak of coronavirus (COVID-19) was reported in Wuhan, China. This contagious disease spreads from person to person. The viral infection is characterized by acute respiratory disorders and symptoms, such as fever, cough, dyspnea, and shivering, which progressively damage the structure and function of the lung alveoli. In addition, the infection could be fatal in numerous cases [1].

COVID-19 has spread rapidly in China and other parts of the world. The new coronavirus, which is scientifically known as SARS-CoV-2 and the resulting disease (COVID-19) have caused great concerns and panic worldwide. The World Health Organization (WHO) has issued a statement that the outbreak of the virus is causing a public health emergency across the world. According to the WHO report, 5,393 deaths have been recorded due to COVID-19 worldwide, with 11,364 cases and 514 deaths reported in Iran [2].

Given the unprecedented effects of COVID-19 on health systems globally, the significant impact of this epidemic is inevitable on cancer prognosis [3]. In addition to the risks that the direct uptake of the virus may pose to cancer patients, delayed diagnosis and non-optimal care may have greater adverse effects on this patient population [4].

Chronic diseases, such as cancer are a major global concern and are associated with high mortality after lengthy and difficult treatments [5]. Cancer patients face a wide range of complications, including hematological disorders (e.g. neutropenia, thrombocytopenia and granulocytopenia), hypoxemia, hypoalbuminemia, treatment-related toxicity and immunodeficiency, which further increase their risk of contracting various infections. Therefore, special attention is given to cancer patients in case of infectious epidemics (e.g. the H1N1 flu epidemic in 2015) in order to reduce the associated mortality and morbidity [6, 7].

Health professionals encourage cancer patients to develop multiple self-care behaviors [6]. Self-care is the first step toward a healthy community and 60% of illnesses could be reduced by self-care. The main outcome of self-care improvement is proper decision-making regarding the use of health care [8]. Furthermore, self-care is recognized as the most effective approach to the prevention of various diseases and disabilities and overall health improvement [9].

Self-care behaviors encompass health maintenance, monitoring, and management [6]. Training on self-care behaviors in cancer patients is paramount, as it aims to empower patients to manage their disease and improve their quality of life [10-13]. In the current coronavirus pandemic, the risk of mortality and morbidity has generally increased, especially in vulnerable populations, such as cancer patients. As such, self-care learning in these patients should be prioritized for the prevention of infectious diseases [5, 14]. The results of a study by Lau et al. on the SARS epidemic in Hong Kong showed that the perceptions and behaviors regarding SARS care developed rapidly during the epidemic, and Hong Kong residents were quick to adopt appropriate preventive measures. Notably, the timely dissemination of information is crucial to the management of public health crises [15].

Due to the rapid spread of the coronavirus and the need for home quarantine (particularly for cancer patients), the recruitment of training personnel for exposure and treatment in medical centers seems essential, as the current pandemic may decrease access to healthcare services in some areas. Electronic health-based interventions are preferred for self-care learning with a focus on disease prevention in cancer patients [16-18].

Telenursing is a communication model between nurse and client that was first presented by Peplau, a nursing theorist in 1952. Telenursing emphasizes education and self-care, and it helps alleviate issues such as the limitation of hospital beds and nursing personnel, while also reducing treatment costs and the transmission of the disease, thereby becoming a new opportunity during the COVID-19 pandemic [19].

Given the importance of preventing the coronavirus (especially in high-risk individuals), the present study aimed to identify the effect of telenursing education and follow-up on self-care behaviors for preventing COVID-19 in cancer patients undergoing chemotherapy and radiation therapy in Sabzevar, Iran.

Methods

This interventional study was conducted on patients with various types of cancer undergoing chemotherapy and radiation therapy referring to a large hospital in Sabzevar, Iran, in 2020, for one month (30 minutes daily)

Participants

Sampling was conducted in two stages: First, through convenience sampling, and then the selected samples were randomly assigned to intervention and control groups. The inclusion criteria were as follows: 1) Age of more than 18 years; 2) A cancer diagnosis in Sabzevar; 3) Having a smartphone (either by the patient or a family member); 4) Stage I-III cancer and 5) no COVID-19 diagnosis based on medical records. The exclusion criteria included hospitalization and non-responsiveness for more than three days via phone/WhatsApp. Notably, we imposed no limitations regarding the type or number of chemotherapy cycles during radiotherapy sessions.

Sample size

The sample size was calculated using G*Power software, version 25. According to the study by Shahsavari [12], with an effect size of 0.96, a confidence interval (CI) of 95% and a test power of 0.95, the sample size was determined to be 29 in each group (total sample size n=58). A type I error was considered at 0.05. Data analysis was performed in Stata software, version 14.

Outcome assessment

Data were collected using a researcher-made self-care questionnaire, a demographic questionnaire and a medical information form. Demographic data included age, gender, education level, marital status and occupation status and the medical information form consisted of data on cancer diagnosis, cancer stage, cancer type (blood/mass) and cancer treatment. An additional item was also used for the post-test, which determined whether the patients had COVID-19.

The self-care questionnaire was employed to evaluate the self-care behaviors of the patients for the prevention of COVID-19 with 42 items, which assessed various dimensions of hand hygiene (ten questions), personal hygiene (14 questions), nutrition (seven questions), oral health (three questions) and mental health (13 questions) of the cancer patients in terms of self-care behaviors with a yes/no response. The items in this questionnaire were within the range of 0-42, with the higher scores indicating better self-care [20].

The questionnaire was designed by the researcher and its content validity and face validity were evaluated by ten faculty members of Sabzevar University of Medical Sciences. The content validity ratio (CVR) and item-level content validity index values regarding the validity of the instrument were within the range of 0.7-1 (S-CVI=0.90). In addition, the reliability of the instrument was evaluated by asking 20 patients to complete the questionnaire as a re-test with a one-week interval and the internal correlation coefficient was calculated to be 0.82.

Intervention

After obtaining the required permissions from the ethics committee of the university and submitting a letter of introduction to the oncology ward of Vasei Hospital, a list of the names and contact numbers of all the cancer patients was prepared. Given the importance of quarantine for patients at home, telenursing education was conducted using e-learning technology. The participants were contacted via phone, and after initial explanations about the research project and their agreement to participate, further research procedures were clarified. If an individual was insufficiently literate and could not understand the explanation, the researcher would speak to a literate family member who was constantly available, and they would be asked to install WhatsApp on their smartphone. Then, a group entitled "We will defeat Corona" was formed via the software. After stating the objectives and providing explanations in the online group, the demographic information questionnaire and the researcher-made self-care questionnaire were uploaded to the group. To ensure the confidentiality of the responses, the patients were asked to send their completed forms via private chat and disease data were extracted from the treatment file.

After reviewing the results of the questionnaires and assessing the educational needs, a 30-minute daily training content package was provided to the subjects based on their self-care behaviors for the prevention of the coronavirus. This package included images, videos and animations related to cancer, the coronavirus, sedation, and humor. The reason for choosing multimedia educational content rather than written media (e.g. books and pamphlets) was its applicability for all patients, as there were no age limits or literacy requirements, allowing more patients to benefit from the teachings of the study.

These educational materials were prepared using various websites. After preparing the packages, the contents were also scientifically approved by three faculty members.

The training packages, which included four main topics about cancer, the coronavirus, prayer to God and humor, were provided to the patients in the daily online group.

Cancer educational content includes disease complications, treatment complications, healthy nutrition, awareness development, personal hygiene, self-confidence, mental health, statistics and prediction, and prevention. The educational content related to COVID-19 includes the need for proper care and monitoring of the virus diseases, cancer, the speed of virus spread and WHO recommendations.

The follow-up with the subjects based on their behaviors was also performed daily for one month via phone. Notably, interactions were encouraged among the online group members regarding their questions and responses. Those who did not attend the group for more than three days or did not answer the phone were excluded from the study.

The questionnaires were prepared and sent electronically. If a patient was illiterate, the researcher would explain the questionnaire to them via phone and complete it with the help of a family member. After one month, the questionnaires were provided to the online group members again. Notably, the control group received only routine care for the disease at the medical center, and the initial questionnaires were completed. After one month and without intervention, the questionnaires were completed again and the results were reviewed by the researcher. For ethical observations, the educational content was provided to the patients in the control group after the completion of the research project.

Data analysis

All continuous and categorical variables were expressed as Mean±SD and frequency (percent), respectively, and analyzed by the independent t-test, Fisher's exact test and chi-square test. After checking the normality of variables using the Kolmogorov–Smirnov test, the independent t-test was used to compare the mean total score and mean score per dimension of self-care between the two groups. Also, the paired t-test was used to compare the mean score of self-care in each group. To investigate the effects of contextual variables on the obtained results, the analysis of covariance (ANCOVA) was used. Type I error was considered to be 0.05. Data analysis was performed using Stata software, version 14.

Results

Out of 57 participants, 26 were in the intervention group and 31 were in the control group. The minimum age of the participants was 29 years and the maximum age was 89 years. The mean age of the participants was 58.24±13.27 years, and the majority were female (n=35; 61%), married (n=47; 82%) and housewives (n=27; 47.4%). Breast cancer was the most common cancer among the studied subjects (n=24; 42.1%). Table 1 shows the demographic characteristics of the participants in the intervention and control groups.

According to ANCOVA results, the intervention and control groups were homogenous in terms of all the variables except for cancer diagnosis and education (Table 2).

Table 3 shows the total mean score of self-care before and after the intervention in the intervention and control groups. Accordingly, the mean score of self-care in the control group was 4.42±23.09 and 22.68±22.74 before and after the intervention, respectively. In the intervention group, the mean score of self-care was 21.65±8.72 and 3.14±36.76 before and after the intervention, respectively. The results of the independent t-test indicated a significant difference in the mean score of self-care between the two groups after the intervention (P<0.01) (Table 2). Figure 1 depicts the comparison of the mean score of self-care before and after the intervention. Table 3 shows the total mean score of self-care before and after the intervention in the intervention and control groups. Accordingly, the mean score of self-care in the control group was 4.42±23.09 and 22.68±22.74 before and after the intervention, respectively. In the intervention group, the mean score of self-care was 21.65±8.72 and 3.14±36.76 before and after the intervention, respectively. The results of the independent t-test indicated a significant difference in the mean score of self-care between the two groups after the intervention (P<0.01) (Table 2). Figure 1 depicts the comparison of the mean score of self-care before and after the intervention.

Table 3 reveals the results of the independent t-test comparing the Mean±SD of different subscales of self-care between the two groups before and after the intervention. All dimensions were statistically significant in the self-care group both before and after, as well as between the two groups after the intervention.

After the intervention, no cases of COVID-19 were detected in the intervention group, while four cases of COVID-19 were reported in the control group. However, statistical tests showed no significant difference.

To investigate the effects of contextual variables on the obtained results, we used ANCOVA. In the regression analysis, the effects of the contextual variables and self-care score before the intervention were adjusted for

Table 1. Demographic and baseline clinical characteristics of the participants (n=57)

Parameter		No. (%)/Mean±SD		P
		Control (n=31)	Treatment (n=26)	
Age (y)	Range	29-78	35-89	0.116*
	Mean age	51.51±15.02	57.57±13.27	
Sex	Male	11(35)	11(43)	0.598*
	Female	20(65)	15(57)	
Marital status	Married	26(84)	21(81)	0.455**
	Single	3(9)	1(4)	
	Widow	2(7)	4(15)	
Working status	Employed	9(29)	11(42)	0.388**
	Housewife	15(48)	12(46)	
	Retired	4(13)	1(4)	
	Others	3(10)	2(8)	
Education	Illiterate	10(32)	5(19)	0.0258*
	Primary school	3(10)	11(42)	
	Middle school	9(29)	7(27)	
	University	9(29)	3(12)	
Cancer diagnosis	Breast	15(49)	9(35)	0.0162**
	Pancreatic	0	2(8)	
	Gastrointestinal and liver	4(13)	3(11)	
	Head and neck	3(10)	0	
	Prostate	0	1(4)	
	Leukemia	0	3(11)	
	Laryngeal, lung	2(6)	3(11)	
	Uterus	2(6)	0	
	Melanoma	0	1(4)	
	Total	26(84)	22(85)	
	Missing	5	4	
Group stage (solid tumors)	I	7(23)	3(11)	0.181**
	II	11(35)	9(35)	
	III	2(6)	7(27)	
	IV	1(3)	2(8)	
	Missing	10(32)	5(19)	
Cancer treatment type	Chemotherapy	9	6	0.128**
	Radiotherapy	8	6	
	Both	10	5	
	Others	3	9	

*Fisher's exact test, **Chi-square test.

Table 2. Comparison of mean self-care scores between the two groups before and after the intervention

Variable	Group	Mean±SD		T, df, P
		Before Intervention	After Intervention	
Self-care	Control	23±4.4	22.7±4.6	1.009, 30, <0.321
	Intervention	21.6±8.7	36.7±3.1	-11.112, 25, <0.001
	T, df, P	-0.807, 55, 0.423	13.007, 55, <0.001	-

T: T-test statistics; df: Degrees of freedom.

the self-care score after the intervention and a significant difference was observed between the intervention and control groups after the adjustment (P<001). The model revealed a high correlation between the self-care score and the group (r=0.93).

Discussion

Stress is highly prevalent in diseases associated with a high risk of infections. Therefore, dynamic assessment plays a key role in the psychological crisis of such diseases, as the psychological stress caused by the possibility of developing a disease weakens the immune system and deteriorates overall health [21]. Zhang et al. indicated that the stress caused by COVID-19 adversely affects overall health, sleep quality and post-traumatic stress symptoms. Moreover, stress and anxiety could weaken the immune function, thereby increasing susceptibility to diseases, such as the coronavirus [22]. As a result, people need to learn effective strategies for anxiety control [23]. In general, success in self-care for a patient requires the necessary knowledge of health-promoting behaviors [24]. Public awareness of disease management and prevention of the coronavirus plays a pivotal role in this regard, as people are currently sensitive to the training process and the importance of self-care and adherence to healthcare instructions.

The results of Abu El-Kass et al. regarding the impact of self-care on cancer patients undergoing chemotherapy indicated that more than half of the patients had insufficient knowledge of cancer, chemotherapy complications and their control, and self-efficacy level. In the mentioned study, a significant correlation was reported between self-care and daily activities [25]. On the other hand, Latifi et al. showed that providing health information could improve the power of self-care in women with breast cancer, suggesting that providing health information services is essential to supporting self-care in women by health authorities [26]. Implementation of educational programs in Bidi's study also had positive effects on the attitude and self-care behaviors of diabetic patients [27].

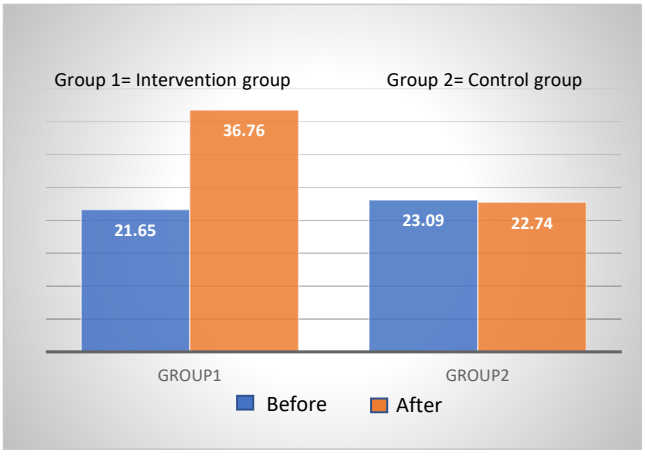

Figure 1. Self-care score before and after the intervention in the groups

Table 3. Comparison of mean scores of self-care subscales between the two groups before and after the intervention

Variables	Groups	Mean±SD		P
		Before Intervention	After Intervention	
Hand hygiene	Control	5.96±2.05	6.19±2.08	0.006
	Intervention	5.61±2.29	8.96±1.18	<0.001
	P	0.544	<0.001	
Personal hygiene	Control	7.64±1.53	7.67±1.59	0.745
	Intervention	7.15±3.04	11.0769±0.97	<0.001
	P	0.460	<0.001	
Nutrition	Control	4.19±1.04	4±0.96	0.110
	Intervention	3.96±2.02	6.34±0.74	<0.001
	P	0.601	<0.001	
Oral hygiene	Control	1.64±0.79	1.16±0.77	0.131
	Intervention	1.61±1.02	2.65±0.48	<0.001
	P	0.902	<0.001	
Mental health	Control	4±1.25	3.94±1.7	0.849
	Intervention	3.22±2.07	7.77±1.76	<0.001
	P	0.195	<0.001	

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Telenursing education and telecommunication using new communication technologies (e.g. cyberspace) can be as effective as face-to-face training in increasing adherence to theoretical and practical recommendations. Furthermore, this technology provides quick access to health counseling services, reduces excess costs, improves access to specialized skills and increases the quality of life by encouraging users to participate virtually rather than in person. As a result, a multitude of information can be transmitted over long distances at minimal costs [28].

In the intervention group of the present study, no cases of COVID-19 were reported in the patients diagnosed with cancer after providing educational content based on self-care behaviors for the prevention of the disease for one month. In the control group, a few cases of COVID-19 were detected, which highlights the effects of training on the prevention of COVID-19, as the awareness of self-care behaviors reduces patients' fear and stress and will be effective in their adherence to health recommendations. The results of Zareipour et al. regarding the effectiveness of telenursing education in the sailors in the context of COVID-19 demonstrated that this method could be provided in two dimensions of self-care training to prevent COVID-19 and dedicated self-care learning to prevent common diseases. Consequently, knowledge and awareness will increase, and people's insights and attitudes regarding the prevention of infectious diseases will affect their health-related practices in this regard [29]. Self-care training can increase the quality of the information received by patients. In addition, awareness of treatment goals in patients leads to the acceptance of their treatment methods, which in turn will improve the effectiveness and results of treatment [30]. Telenursing education reduces the relationship between diabetic patients and physicians, therapists, and healthcare providers, thereby decreasing the risk of disease contraction in the context of infectious diseases [31]. Safian et al. also indicated that the implementation of self-care programs based on mobile applications was effective in improving the balance of patients with multiple sclerosis. Therefore, it could be inferred that such interventional programs are a supportive method to manage diseases and acquire self-care skills in chronic patients [32].

Perisetti and Goyal conducted a study involving successful telemedicine during the COVID-19 pandemic, reporting that providing telemedicine information is a low-cost tool that could provide appropriate patient learning if presented properly. This technique would be highly beneficial in providing high-quality patient-oriented care and prioritizing face-to-face visits in areas that require complex medical care. The results of using telemedicine to provide information on the COVID-19 pandemic may provide an opportunity for policymakers and health organizations in order to develop proper strategies to improve access and safety in the care of patients with chronic diseases [33]. Another study in this regard was conducted by Mak et al. on the training of neutropenia-induced fever-preventing self-care behaviors in patients with breast cancer. Their findings demonstrated no significant differences in the rate of hospitalization due to neutropenia-induced fever, awareness level and self-efficacy in self-care behaviors between the two groups [34].

In the current research, the statistical tests showed no significant difference between the two groups in terms of COVID-19, which could be due to the small sample size; these findings may appear significant in larger sample sizes. On the other hand, the absence of COVID-19 was an inclusion criterion and four subjects were infected in the control group, while none of the subjects in the intervention group were affected by the disease. Therefore, it could be inferred that the training intervention was effective in preventing the infection although the difference was not statistically significant. In any case, the absence of even one of the patients in the intervention group in the second peak of the coronavirus is a significant finding of the present study.

One of the limitations of the present study is that the participants were volunteer cancer patients from Vasei Hospital, affiliated with Sabzevar University of Medical Sciences in Iran, as mentioned earlier. Replicating the same study in other hospitals or regions might provide further insight into exploring training interventions.

One of the strengths of this study is that considering that cancer patients had to stay at home during the quarantine, self-care education via telenursing helped them adopt health-promoting behaviors and prevent COVID-19 during these stressful conditions.

Conclusion

According to the results, telenursing education could improve the self-care behaviors of cancer patients to prevent coronavirus infection. In the intervention group of the present study, no cases of COVID-19 were reported among the patients diagnosed with cancer after providing educational content based on self-care behaviors for the prevention of the disease for one month. In the control group, a few cases of COVID-19 were detected, which highlights the effects of training on the prevention of COVID-19, as awareness of self-care behaviors reduces patients' fear and stress and will be effective in their adherence to health recommendations. Our findings indicated that learning through new technologies (providing educational content through distance learning) could be effective alongside face-to-face learning during the current COVID-19 pandemic for cancer patients diagnosed with high-risk diseases under such circumstances.

Ethical Considerations

Compliance with ethical guidelines

The study protocol was approved by the Review Board of Sabzevar University of Medical Sciences, Sabzevar, Iran (Code: 98250) and also approved by the Ethics Committee of Sabzevar University of Medical Sciences, Sabzevar, Iran (Code: IR.MEDSAB.REC.1399.065). All participants provided written informed consent and the anonymity of participants was preserved.

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Authors' contributions

All authors contributed equally to the conception and design of the study, data collection and analysis, interpretation of the results, and drafting of the manuscript. Each author approved the final version of the manuscript for submission.

Conflict of interest

The authors declared no conflict of interest.

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